

# EXHIBIT K



# *RM Hunt, Ltd.*

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July 18, 2019

Bruce Moss  
Denenberg Tuffley  
One Northwestern Plaza  
Suite 600  
Southfield, MI 48034

**RE: Kwiatkowski v FXI**

Dear Mr. Moss:

You have asked me for an independent Human Factors Engineering analysis of an incident that occurred on July 11, 2016, involving a fire at the home of Mr. and Mrs. Kwiatkowski at 2743 Addison Circle North, Oakland Township, Michigan.

This letter contains my report, including analysis and opinions, in the above referenced matter. These opinions are based on the information available to me at this time. If more information becomes available as discovery continues I reserve the right to amend or modify these opinions as appropriate.

## **Qualifications**

I hold the BS and MS in Industrial Engineering and a PhD in Mechanical Engineering from the University of Illinois. While at the University of Illinois I taught machining processes to undergraduates and pursued applied research in the areas of troubleshooting and human error. While the focus of my professional career is human factors, my background in mechanical and industrial engineering is central to my work. This education and professional experience enables me to consider design and manufacturing issues in addition to the human interface

features of products. These issues also include the relevant warnings, instructions and human interaction, including expected use and misuse of a particular product or process.

After receiving my PhD in 1981 I took a position on the faculty at the Georgia Institute of Technology where I taught, among other things, Human Factors and Man-Machine Systems in the Department of Industrial and Systems Engineering. While at Georgia Tech I co-founded, owned and operated Search Technology, Inc., a firm involved exclusively with applied research and development in Human Factors Engineering.

Over a twenty year period Search Technology secured research contracts in the area of Human Factors Engineering from government agencies including the Army Research Institute, the National Aeronautics and Space Administration, the Federal Aviation Administration, the Office of Naval Research, the Naval Personnel Research and Development Center, Armstrong Laboratory, Oak Ridge National Labs, the Electric Power Research Institute and many others. Search Technology also secured applied development contracts involving Human Factors Engineering from commercial and industrial customers including General Electric, Motorola, FEDEX, Coca-Cola, Delta Airlines, Proctor & Gamble and many others. In 2003 I sold Search Technology to pursue other interests.

In 2003 I joined the faculty at Southern Polytechnic State University where I taught Human Factors, Engineering Analysis and Design, Process Improvement, Statistics, Quality Assurance and a number of related courses at the undergraduate and graduate levels. While at Southern Poly I served as Program Coordinator for Systems Engineering, Department Chair of Industrial Engineering Technology, Director of Research, and, in 2008 I became Dean of the Extended University. In January of 2015 I became Associate Vice President for Research at Kennesaw State University. Before retiring January 1, 2018 I served for two years as Assistant Dean of Engineering at Kennesaw State University. I am currently the owner and only employee of RM Hunt, Ltd.

In addition to research and teaching I have been involved, throughout my career, in product and process analysis and design with a particular emphasis on warnings and instructions. Relevant to the task I have been asked to do here, this necessarily has required me to develop and maintain

an expertise in design and human factors as it relates to how humans interact with the manufactured environment. I have consulted on a wide variety of consumer and industrial products both inside and outside of litigation for more than 30 years.

A complete CV is attached to this report (Appendix A) as well as a list of cases I have testified in during the last 4 years (Appendix B) and a letter of engagement for the services rendered in this matter (Appendix C). I am certified consistent with OSHA requirements by having completed an OSHA 10-Hour Training for General Industry and a Forklift Certification (OSHA) Class I - VII. I expect that I will use the materials discussed in this report as exhibits should I be called upon to testify at trial. I expect I will also refer to any animations, diagrams, photographs, warnings, manuals, and videos that are used by other experts retained in this matter.

#### **Items Reviewed in Connection with this Case**

1. Complaint – 5/31/18
2. Case Report, Oakland County Sheriff Offices
3. Rain Filter packaging graphics - FXI 908
4. Rain Filter Installation Instructions - FXI 988 – 991
5. FXI – Warranty Claim Form – FXI 993 - 994
6. Deposition transcript of Marc Alberio – 5/16/19 with exhibits #1-23
7. Deposition transcript of Kevin Kwiatkowski – 6/17/19 with exhibits #1 - 8
8. Deposition transcript of Priscilla Kwiatkowski – 6/17/19 with exhibit #1
9. Deposition transcript of Jacqueline Kwiatkowski – 6/17/19
10. Deposition transcript of Pierson Kwiatkowski – 6/17/19
11. Deposition transcript of Jackson Kwiatkowski – 6/17/19 with exhibit #1
12. Gutter Clear marketing video
13. Accident video 7/11/6

### **Additional Reference Sources**

1. An Introduction to Human Factors Engineering. Wickens, Liu, Gordon-Becker, Pearson 2003
2. Principles of Human Safety. Ralph L. Barnett and William G. Switalski, 1988, Triodyne Inc.
3. Safety Hierarchy. Ralph L. Barnett and Dennis Brickman 2005, Triodyne Inc.
4. ANSI Z535.1, Safety Colors, 2011
5. ANSI Z535.3, Criteria for Safety Symbols, 2011
6. ANSI Z535.4 Product Safety Signs and Labels, 2011
7. ANSI Z535.6, Product Safety Information in Product Manuals, Instructions, and Other Collateral materials, 2011
8. Human Factors Issues to Be Considered by Product Liability Experts, A. Vrendenburgh and I. Zackowitz, in Handbook of Human Factors in Litigation, CRC Press 2005.
9. The Safety Hierarchy and Its Role in Safety Decisions, K. Laughery and M. Wogalter, In Waldemar Karwowski and Gavriel Salvendy (Eds.) Advances in Human Factors, Ergonomics and Safety in Manufacturing and Service Industries (pp. 1010-1016). Boca Raton, FL: CRC Press.
10. Handbook for Manufacturing Safer Consumer Products, Consumer Product Safety Commission, 2006.
11. Safety Hierarchy, R. Barnett and D. Brickman, Triodyne Inc., 1985.
12. Warnings, Volume 1: Fundamentals, Design and Evaluation Methodologies. M. Lehto and J. Miller, Fuller Technical Publications, 1988.
13. Warnings and Risk Communication, M. Wogalter, D. Dejoy and K. Laughery. Taylor & Francis, 1999.
14. Preventing “Accidental” Injury: Accountability for Safer Products by Anticipating Product Risks and User Behaviors. S. Statler in Handbook of Human Factors in Litigation, CRC Press 2005.
15. Human Factors engineering and Design. M. Sanders and E McCormick. New York: McGraw-Hill; 1993.

16. Manufacturer's Guide to Developing Consumer Product Instructions, Timothy Smith (Ed), US Consumer Product Safety Commission, 2003

### **Incident Summary**

On or about May 24, 2012, Mr. Kwiatkowski purchased the Rain Filter Gutter Filtration product manufactured by FXI, Inc. from a local Costco store. Mr. Kwiatkowski intended to install this product at his home at 2743 Addison Circle North, Oakland County, Michigan, to keep debris, tennis balls and baseballs out of his gutters. Mr. Kwiatkowski had not researched this product in advance but had purchased it based on a display that he saw in the store and the information provided on the box of the product. Shortly after purchasing the product Mr. Kwiatkowski installed the product in the gutter over his garage by following the instruction provided. He reported that the product was easy to install and it worked as advertised up until July 11, 2016.

On or about July 11, 2016, Pierson Kwiatkowski (13 years old at the time) had lit a sparkler while on the driveway in front of the house. At some point when the sparkler was more than halfway consumed (Pierson Kwiatkowski, p14), Pierson threw it into the air for no specific reason other than to see it emit sparks in the air (Pierson Kwiatkowski, p12). Although he intended to throw it straight up, the trajectory of his throw of the wind caused the sparkler to land on the roof of the house where it rolled down and into the gutter and onto the Rain Filter product (Pierson Kwiatkowski, p20). Approximately 10 -15 seconds later the Rain Filter began to burn. Despite the efforts of Pierson and his brother and sister to extinguish the fire with water, the flames grew and eventually caused significant damage to the home and furnishings which ultimately required 16 months and more than a million dollars to repair.

### **Analysis Process**

In analyzing cases such as this I follow an approach, or methodology, that I developed and have employed in hundreds of projects over the last thirty years. I have analyzed the product in this case based on my education and 30 years' experience as an industrial engineer, mechanical engineer, and human factors expert. The steps in this methodology are generally, if not almost universally, accepted in the human factors engineering profession. It is the same analysis a

human factors expert applies whether the situation involves litigation or not. This approach is outlined here below and described in some detail in Appendix D to this report.

1. **Identify hazards. This can be done by analysis of the human machine interface and the environment in which the equipment is used and/or from accident records reflecting empirical evidence.**
2. **Consider whether hazards can be eliminated or mitigated by following the hazard control hierarchy. (The hazard control hierarchy is sometimes referred to as the Design Safety Hierarchy or simply, The Safety Hierarchy.)**
3. **Consider the need for, and viability of, warnings, instructions, and/or other collateral materials.**
4. **Consider existing labels, warnings, instructions and other collateral materials to determine if hazards are adequately identified and if so, how warning information is conveyed to affected parties.**
5. **Consider similar products and processes to establish the state of the art for product and process design.**
6. **Consider pertinent training materials.**
7. **Consider the behavior of the individual(s) involved (as well as behavior expected of operators in a more general sense too.)**
8. **Consider relevant applicable regulations.**
9. **Consider standards within the industry and generic industrial standards (a.k.a. voluntary or consensus standards).**

### **Analysis of This Case**

#### **Hazard Identification**

Controlling hazards requires an understanding of the hazard, how and how often a user might be exposed to this hazard, whether they would recognize the hazardous situation and the consequences of encountering the uncontrolled hazard. Only once these elements are understood can one determine what, if anything, can or should be done to control the hazard.

## **Hazard Analysis**

The hazard that is the subject of this report pertains to the flammability of the Rain Filer Gutter Filtration product manufactured by FXI. Based on deposition testimony of Marc Albero, a Chemical Engineer and Senior Director of Technical Products at FXI, it was known by FXI that 1) flaming embers from chimneys, wood burning stoves, or forest fires were potential sources of ignition for a foam gutter filter (Albero, p33) and 2) the uncoated foam product, as it was sold to Mr. Kwiatkowski would not pass accepted fire resistance tests (Albero, p62).

## **Consider whether hazards can be eliminated or mitigated by following the hazard control hierarchy**

It is generally accepted that once a hazard has been identified, the most reliable way to protect users from harm is to follow the Hazard Control Hierarchy. That is to say that the most reliable means of controlling a hazard is to eliminate the hazard through design.

### **Eliminate the hazard**

The flammable nature of the foam gutter filter is not inherent in its utility. Therefore, manufacturing a gutter filter from some non-flammable material is a potential means of eliminating the subject hazard. A variety of non-flammable, non-foam gutter protection products have been available in the market for years. However, there are benefits to using a foam filter approach that include ease of installation by homeowners, reduced costs and aesthetics. Therefore, it is useful to consider whether the flammability hazard of a foam gutter filter can be reliably mitigated while still retaining these other benefits.

### **Mitigate the hazard**

If the hazard cannot be eliminated a decision must be made as to what level of mitigation, in this case - fire resistance, will be considered acceptable. I am unaware of any fire resistance test that applies specifically to foam gutter products. However, different fire resistance tests have been developed in different industries to suit application specific needs. Procedures have been developed for testing the flammability of clothing fabrics, mattresses and furniture, building

materials, automotive parts, liquid chemicals and many others.

ASTM D2859, the methenamine pill test, was developed to test the burn characteristics of finished textile floor coverings (eg, carpet). The test is meant to assess the flammability of a given material as it might respond to a cigarette or match dropped onto its surface. This pass/fail test does not require that the material being tested does not burn at all but rather that the burned area does not exceed a specified distance from the source of ignition (the pill) before it burns itself out.

The pill test was identified by FXI as a method of assessing the fire resistance of a foam gutter filter because 1) when in use the foam gutter filter product is oriented in a horizontal plane, as is carpet, 2) the ignition sources of concern are such things as embers from chimneys or forest fires falling onto the surface of the product (Albero, p33), and 3) this test was easy and economical to administer. The pill test was known to FXI and used by Cushion By Design, Inc. (CBD), an FXI contractor, to test their foam gutter filter products (Albero, Ex 8).

According to Mr. Albero, FXI and other foam gutter filter manufacturers have used different fire resistant chemicals in the base foam as well as in coatings applied after the foam is manufactured. The purpose of including fire resistant chemicals in the foam and in the coating is to mitigate the flammability hazard. FXI has used methenamine pill testing procedures in the course of experimenting with various chemical recipes and manufacturing techniques. At the time Mr. Kwiatkowski purchased the Rain Filter product, FXI was aware of,

- the presence of the flammability hazard in their untreated foam gutter filter products,
- then need to mitigate the flammability hazard in their foam gutter filter products,
- the viability of using fire resistant coatings in their foam gutter filter products to make them safe in light of its intended use,
- the fact that the FXI Rain Filter product was to be marketed and sold to homeowners who would likely not have an appreciation for the flammability hazard of non-fire resistant foam gutter filters or the potential sources of ignition,
- the fact that the Pill Test was a recognized fire resistance standard test method and that it was easy and economical to administer, and

- the FXI foam filter would not pass the pill test without the fire resistant coating (Albero, p91).

To summarize, FXI recognized a flammability hazard in their Rain Filter product and further recognized the need to mitigate this hazard. Finally, they adopted a testing method but then failed to insure that this test was administered to its product and therefore, failed to determine that they had mitigated the flammability hazard. (Note: I am not a materials engineer and my discussion here of the pill test is not meant to be an endorsement of that specific test. Rather, it is recognition that some sort of test could and should have been used to consistently verify that the Rain Filter flammability hazard had been mitigated.)

**Consider the need for, and viability of, warnings, instructions, and/or other collateral materials.**

The third level of the Hazard Control Hierarchy involves communicating through training, warnings and/or instructions to users so that they will be aware of hazards and be informed of how to modify their behavior so as to avoid being exposed to identified hazards.

Generally, the manufacturer has a duty to warn where:

1. the product supplied is dangerous;
2. the danger is or should be known by the manufacturer;
3. the danger is present when the product is used in the usual and expected manner; and
4. the danger is not obvious or well known to the user.

Manufacturers of consumer products and industrial products must insure that users of their products are adequately informed of all hazards associated with the anticipated use of the product and how to mitigate these hazards. The Consumer Product Safety Commission states that the ability of manufacturers to recognize and anticipate the circumstances under which products are used or misused is central to the effective design and production of safe products (CPSC, 2006). In another publication the CPSC states, “Instructions do not exist in a vacuum. They are part of a system of Product-oriented elements that must work together. These elements include the physical product design, user interfaces, on-product warnings and messages, packaging, marketing and training.” It goes on to point out, “Instructions are a tool for consumers to use to

do something. Like any other good tool, instructions must be designed for use. Think of their development not as an effort of writing, but of engineering.” (CPSC, 2003) It is with this approach in mind that this report analyzes the design of the subject warnings and instructions.

The analysis of any situation in which failure to warn is alleged requires answering questions in three areas (Laughery and Wogalter, 2005):

1. Was a warning needed?
2. Was (were) the existing warning(s) adequate?
3. Would additional or different warnings have made a difference?

As discussed above, FXI was aware of the flammability hazard of their uncoated foam gutter filter product. Over time they had determined that this hazard could be reasonably mitigated by coating the exposed surface of the product with a chemical that would make it fire resistant. In fact the subject product and a substantially similar product marketed and sold to contractors/professional installers, had included this fire resistant treatment prior to the sale to Mr. Kwiatkoski. At least one of the retailers to whom FXI was selling the subject product had established a contractual requirement that the foam be manufactured to so as to be fire resistant. However, without informing the retailer from whom Mr. Kwiatkowski purchased the product or providing any information to end-consumers like Mr. Kwiatkowski, FXI decided stop including the fire resistant coating on the Rain Filter product in order to reduce manufacturing costs (Albero, p78).

Normally, it is not reasonable to expect a manufacturer to communicate to users/customers all of the safety features that have not been designed into a given product. A listing of features not included could be nearly infinite in length for most products. However, certain features by virtue of their importance to safety and by the fact that they are included in some products within a class, but not all, should be considered for inclusion. One example would be for drywall or sheetrock. There are some types of sheetrock that are specifically manufactured and tested to be fire resistant. However, other types of sheetrock do not have this special rating and manufacturers and retailers include this in their marketing materials. Statements like “Intended for non-fire-rated applications” convey important information to users that they should consider

other products if fire is a recognized hazard for their intended use.

A warning statement indicating that the FXI Rain Filter was not fire resistant would have conveyed important information to potential consumers at the point of sale so that they could make an informed decision to purchase this product or not.

This analysis now turns to the second question on the Laughery Wogalter list above that asks whether the existing warnings were adequate.

**Consider existing labels, warnings, instructions and other collateral materials to determine if hazards are adequately identified and if so, how warning information is conveyed to affected parties.**

In order to assess whether existing warning(s) are adequate it is necessary to agree on the definition of an adequate warning. There are multiple models for assessing the design adequacy of printed warnings (Laughery and Wogalter, 2005; ANSI Z535, OSHA, CPSC). These models are in general agreement that design adequacy depends on content, format, and location.

Furthermore, an adequate warning should accomplish the following four goals:

- Call attention to the presence of a hazard,
- Identify the nature of the hazard,
- Identify the potential consequences of encountering the hazard, and
- Provide explicit actionable direction on how to avoid the hazard.

The warning mode or format should promote ease of understanding and, in the case of printed warnings, ease of reading with pictorials or symbols and other methods of highlighting important information. The location of the warning should ideally be such that the warning will be received when and where it is useful.

**Location**

In order for a warning to be useful regarding the flammability hazard of the Rain Filter product, it should be conspicuously available to potential customers before they purchase the product. This would suggest that the safety message/warning should be on any marketing display material

and the product packaging. It is also reasonable to include warnings in installation instructions or any other owner care/maintenance type documents.

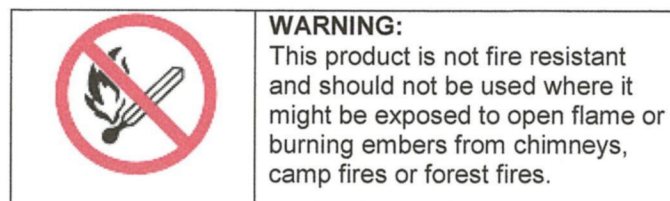
### **Rain Filter Packaging**

#### **Content**

One safety message that appears on the packaging of the Rain Filter product (FXI – 0000908) address a feature that the product does not embody. This message, shown here below, informs that customer that this product should not be used for collecting drinking water.



Clearly, FXI should have created a similar safety message/warning regarding the fact that the product was not manufactured to be fire resistant. It could have appeared in the same vicinity as the warning above and could look something like the following:



### **Rain Filter Installation Instructions**

There are two safety messages in the Installation Instructions (FXI 000988). These two Cautions advise the installer to wear gloves to protect against cuts from sharp edges and to be careful when using ladders to install the Rain Filter product. The content of these safety messages appears to be adequate. However, best practices are to locate warnings before instructions to increase the likelihood that the messages will be noticed and read.

Kwiatkowski.

There was no training available for users of this product beyond the installation instructions. Although elaborate training materials were not needed for this product, FXI could have created a brief video, available on their web site, where they could communicate proper installation as well as convey important safety information. While this could have been useful, such information is not likely to reach customers until after they have purchased the product and at that point, it is much less likely that a customer would go to the effort to return the product based on safety messages contained within the training material.

### **Consider the behavior of the individual(s) involved**

Mr. Kwiatkowski purchased the FXI Rain Filter for the purpose for which it was intended and installed it as per the instructions. Thus, his purchase and use of the product was completely foreseeable by FXI.

The source of ignition for the fire that substantially damaged the Kwiatkowski home was a sparkler that accidentally fell into the gutter when it was thrown into the air by 13 year old Pierson Kwiatkowski. These events lead to several important questions. These questions are asked and answered here below.

1. What laws, rules, regulations govern the purchase and use of sparklers in Oakland Township?

Answer: The state of Michigan prohibits the sale of fireworks to anyone under the age of 18. The state of Michigan recognizes two types of “sparkling” fireworks. Sparklers, such as that being used by Pierson Kwiatkowski are considered “Low Impact Devices.” “Sparkling Devices” are considered novelties and are not regulated by the state. Regarding the use of fireworks, it does not appear that there are any age limits specified.

2. Was there any safety information, warnings or guidance on the package or in the instructions of the sparklers that would have pertained to this situation?

There was cautionary language on the box that the sparklers came in. The following

safety messages were included:

- a. Sparklers are flammable.
- b. Use with close adult supervision.
- c. Use only outdoors.
- d. Do not touch glowing wire.
- e. Hold in hand with arm extended.
- f. Keep away from flammable materials.
- g. Light only one sparkler at a time.
- h. Place in water after use.
- i. Not recommended for children under 12.

Of the messages listed here above only items b, f, and i warrant consideration given the facts of the scenario at hand. Regarding b, Pierson was not under close adult supervision while he was using the sparkler on the day of the fire. However, it is not clear what an adult could or would have done to prevent Pierson from throwing the sparkler into the air on an impulse.

Regarding f, Pierson did not intentionally place the sparkler near to or in contact with a material known to him to be flammable.

Regarding i, Pierson was not under age 12 at the time and was not, therefore, excluded by these instructions/warnings from using the sparklers.

3. Was the hazard of the sparkler igniting the FXI Rain Filter product open and obvious?

There is no reason to believe that Pierson would have had any idea that the FXI Rain Filter could be ignited by a sparkler. Furthermore, the sparkler itself does not convey to a user that it is a particularly dangerous product. The sparks given off by a sparkler have so little energy in them that they seldom cause even the slightest burn when they contact bare skin or clothing. It could be said that sparklers do not have inherent warning characteristics. Furthermore, a product that is implicitly endorsed for use by children 12 years of age and older is not likely to be considered inherently dangerous by children or

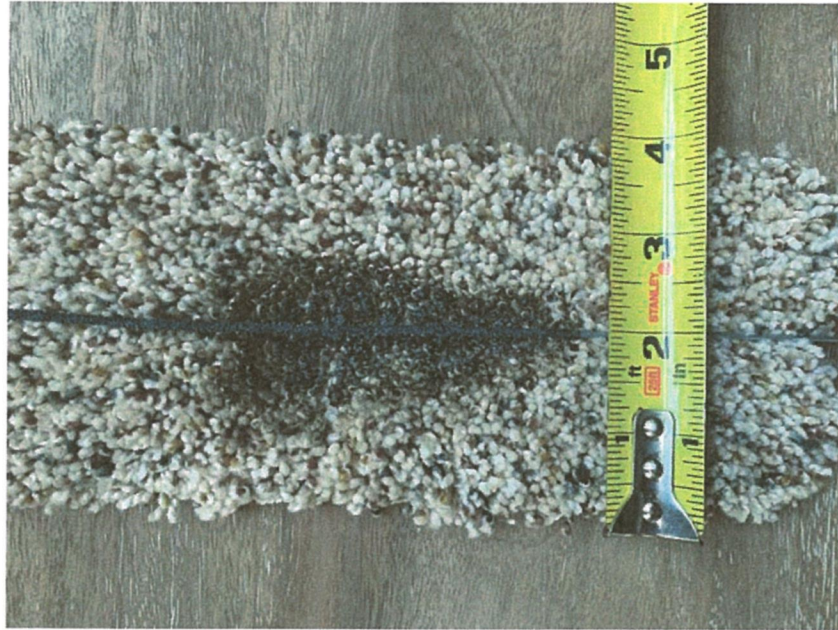
adults.

4. Did the sparklers present a greater hazard of ignition of the FXI Rain Filter product than could have been reasonably foreseen by FXI?

In the deposition of Kevin Kwiatkowski he was asked if he understood that the temperature at which a sparkler burns was high enough to melt metal. This caused me to question whether the high temperature would have caused even a fire resistant product to ignite in the way that the FXI Rain Filter did at the Kwiatkowski home. I believe that this is not the case.

While it is true that sparklers can burn at temperatures in excess of 2000°F, there is very little heat energy in a sparkler. This requires only an understanding of undergraduate thermodynamics and can be demonstrated by placing a lighted sparkler onto a piece of fire resistant carpet. I conducted just such a demonstration.

As can be seen in the photograph here below, the fire resistant carpet is singed in the area where the sparkler was burning but barely an inch to either side. The carpet smoldered while the sparkler was burning but stopped smoking within seconds of the sparkler burning itself out. Had the FXI Rain Filter product been adequately coated with fire resistant chemical, more than likely, it never would have caught fire.



Result of placing a burning sparkler on a piece of fire resistant carpet.

To summarize, it is clear that the Kwiatkowskis were not warned of any fire hazard associated with the FXI Rain Filter product and therefore did not knowingly assume any risk. Mr. Kwiatkoski's behavior with respect to this product is beyond reproach. Furthermore, in his deposition, Mr. Kwiatkowski testified that had he been informed of the fire hazard associated with this product, he never would have purchased it.

Regarding Pierson Kwiatkowski, it is true that his act of throwing a lit sparkler into the air did ultimately lead to the fire that damaged their home. However, his behavior, while ill-advised, could hardly be considered to be unforeseeable and was certainly not an act of reckless disregard for safety.

**Consider relevant applicable regulations.**

I am not aware of any applicable regulations that would specify the formatting and/or content of the warnings specific to the FXI foam gutter filter.

**Consider standards within the industry and generic industrial standards.**

The ANSI Z535 family of standards pertain to safety messages on products and in collateral

materials such as Owner's Manuals. Although they are voluntary standards, they would provide valuable information on the formatting of safety messages.

The Consumer Product Safety Commission has created the Manufacturer's Guide to Developing Consumer Product Instructions (2003) and the Handbook for Manufacturing Safer Consumer Products (2006). While neither of these documents apply to the development of these materials with the force of law, they do provide valuable information that would allow FXI to develop on-product safety information, packaging and instructions that would convey important safety information that improve the clarity and completeness of these materials.

### Opinions

Based on my analysis of the information and materials available to me at this time, the analysis described here above and my education, training and nearly 40 years of experience in human factors and engineering, I have developed the following opinions in this matter:

1. FXI was aware that their Rain Filter product, without the fire resistant coating, exposed users to a flammability hazard.
2. The FXI Rain Filter product was unreasonably dangerous for its intended purpose because it was not fire resistant.
3. Because the FXI Rain Filter product was not fire resistant it exposed the Kwiatkowski family to an unreasonable risk of fire that could arise from a number of different ignition sources.
4. The FXI Rain Filter product was unreasonably dangerous because the marketing materials, installation instructions and packaging materials failed to convey the flammability hazard associated with installing the product in open gutters.
5. The packaging and other documentation for the FXI Rain Filter product should have clearly warned users that it was flammable and could cause significant damage or injury if ignited while being used as intended.
6. Kevin Kwiatkowski used the FXI Rain Filter product in its intended and foreseeable manner.

7. It is unreasonable to conclude that adult supervision of Pierson Kwiatkowski would have reliably prevented the outcome of this incident.
8. It is unreasonable to conclude that anyone in the Kwiatkowski family could have foreseen that throwing a lit sparkler onto the roof of their garage would have ignited the catastrophic fire that ensued.

These are my opinions in this case based on the material available to me at this time. I hold these opinions to be true to a reasonable degree of engineering certainty. If more information becomes available I reserve the right to amend these opinions as necessary.

Sincerely,

A handwritten signature in black ink, appearing to read "Ruston M. Hunt".

Ruston M. Hunt, PhD

## APPENDIX A

### RUSTON M. HUNT CURRICULUM VITAE

#### ADDRESS

RM Hunt, Ltd.  
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#### PROFESSIONAL INTERESTS

Human factors – warning design and evaluation  
Design and evaluation of human-product interfaces  
System design and quality management

#### EDUCATION

BS Industrial Engineering University of Illinois, 1978  
MS Industrial Engineering, University of Illinois, 1979  
PhD Mechanical Engineering, University of Illinois, 1981

#### PROFESSIONAL POSITIONS

2018 – Present	Associate Professor Emeritus, Systems Engineering, Kennesaw State University, Georgia
2015 – 2017	Assistant Dean of Engineering and Associate Professor of Systems and Industrial Engineering, Kennesaw State University, Kennesaw, Georgia  Responsible for accreditation of all engineering and engineering technology programs at Kennesaw State University. Also teach graduate and undergraduate level courses in Systems Engineering, Quality Assurance and Industrial Engineering. Courses taught include Systems Analysis and Design, Human Machine Systems, Statistics, Human Factors of Quality, Process Improvement and Total Quality Management.

- 2015 – 2015 Associate Vice President for Research, Kennesaw State University, Kennesaw, Georgia
- Responsible for development, coordination and administration of externally funded research grants in the areas of applied sciences, engineering, engineering technology, computer science, software engineering and information technology. Responsible for identifying opportunities to develop, protect and market intellectual property across the university. Serve on the Board of Directors of the Kennesaw State University Research and Service Foundation (KSURSF).
- 2011 - 2017 Chief Operating Officer, Southern Polytechnic Applied Research Corporation (SPARC), Marietta, Georgia
- Responsible for day-to-day operations of the university research foundation including development and contract administration of externally funded research grants, sponsored programs, English language classes and continuing education.
- 2008 – 2014 Dean, Extended University, Southern Polytechnic State University, Marietta, Georgia
- Responsible for development, coordination and administration of externally funded research grants, sponsored programs, eCore classes and continuing education for the university. Responsible for teaching graduate and undergraduate level courses in the Industrial Engineering Technology Department. Courses include Human Factors Engineering, Systems Engineering, and Statistics.
- 2007 – 2008 Director, Southern Polytechnic Applied Research Center, Southern Polytechnic State University, Marietta, Georgia
- Responsible for development, coordination and administration of externally funded research grants and sponsored programs for the university. Responsible for teaching graduate and undergraduate level courses in the Industrial Engineering Technology Department. Courses include Human Factors Engineering, Systems Engineering, and Statistics.
- 2006 – 2007 Department Chair, Industrial Engineering Technology, Associate Professor and Systems Engineering Program Coordinator, Southern Polytechnic State University, Marietta, Georgia
- Responsible for management of the Industrial Engineering Technology Department with undergraduate programs in Industrial Engineering Technology, Systems Engineering and Apparel Textile Technology and graduate programs in Systems Engineering and Quality Assurance.

- 2003 - 2005      Assistant Professor and Systems Engineering Program Coordinator, Southern Polytechnic State University, Marietta, Georgia
- Responsible for teaching graduate and undergraduate level courses in the Industrial Engineering Technology Department. Courses include Human Factors Engineering, Systems Engineering, Statistics and Total Quality Management. Also responsible for the Systems Engineering curriculum, scheduling classes and managing faculty and staff.
- 2002 - Present      President, RM Hunt, Ltd., Peachtree Corners, Georgia
- Provide human factors based analysis, evaluation and design of consumer and industrial products and hazard warning materials. Activities include development of warning information as well as post-accident analysis of warnings in support of litigation.
- 1996 - 2002      President and CEO, Search Technology, Norcross, Georgia
- Responsible for corporate wide planning and management. Technical activities include human factors consulting, expert witness testimony in human factors, software system design and development, program management, and review of all program deliverables. Frequent speaker at short courses, conferences and seminars including the Institute of Continuing Legal Education in Georgia (ICLEG) and the Association of Insurance Subrogation Specialists.
- 1988 - 1995      President and Senior Scientist, Search Technology, Norcross, Georgia
- Responsible for corporate wide planning and management. Technical activities include program management, review of all program deliverables, and consulting and expert witness testimony in human factors.
- 1980 -1987      Vice President and Senior Scientist, Search Technology, Norcross, Georgia
- Conduct and manage research in the areas of design and evaluation of computer-based operator aids. The research results are applied in the form of consulting services to commercial clients. Experience ranges from nuclear power plant control rooms to shipboard computerization of non-tactical operations.
- Also responsible for management of software engineering and marketing.

- |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1981-1982 | <p>Assistant Professor, Georgia Institute of Technology, Atlanta, Georgia</p> <p>Responsible for research and teaching in the area of man-machine systems and human factors. Specific interests in the areas of human behavior in fault diagnosis tasks and fault diagnosis training.</p>                                                                                                                                                                                                                                                                                                |
| 1978-1981 | <p>Research Assistant, University of Illinois Coordinated Science Laboratory, Champaign-Urbana, Illinois</p> <p>Responsible for designing and conducting experiments involving computer based training, computer simulations and human subjects. Activities involved computer programming in BASIC, FORTRAN, and Pascal as well as statistical analysis and interpretation of results using the International Mathematics and Statistics Library (IMSL). This research was funded by the Army Research Institute. Also taught adult education classes in programming microcomputers.</p> |
| 1977-1978 | <p>Industrial Engineer, Kraft Foods, Champaign, Illinois</p> <p>Responsible for large distribution warehouse layout and organization of products for shipping. Established a forklift maintenance program for scheduling preventative maintenance and monitoring corrective maintenance.</p>                                                                                                                                                                                                                                                                                             |
| 1977-1977 | <p>Teaching Assistant, University of Illinois Mechanical Engineering Department, Champaign-Urbana, Illinois</p> <p>Taught an introductory course on manufacturing processes which included hands-on demonstrations of large metal cutting machinery and lectures on analytic tools for use in the manufacturing domain.</p>                                                                                                                                                                                                                                                              |

## PROFESSIONAL ASSOCIATIONS

Member, Human Factors and Ergonomics Society  
 Past Member, International Council on Systems Engineering  
 Past Member, American Society for Engineering Education  
 Past Member, American National Standards Institute  
 Past Member, National Safety Council  
 Past Member, National Fire Protection Association  
 Past Member, IEEE Systems, Man, and Cybernetics Society  
 Past Member, American Institute of Industrial Engineers  
 Past Member, Society for Information Display

## ELECTED OFFICES

1982-1983 Secretary, IEEE Systems, Man, and Cybernetics Society

## CERTIFICATIONS

Boating Safety Certification – NASBLA Approved, June 4, 2019

RTK – Global Harmonized System Training – Kennesaw State University, Sep. 23, 2015.

Forklift Certification (OSHA) Class I – VII. Atlanta Technical College, April 29, 2017.

10-Hour OSHA Hazard Recognition Training for General Industry, May 18, 2017.

## PUBLICATIONS

Hunt, R.M. (2016). You'll Shoot Your Eye Out. Proceedings of the DRI Fire Science and Litigation Seminar, Scottsdale, Arizona.

Herring Gas Company (2005). Read, Share, and Keep. Herring Gas Company Safety Booklet. (Note: Served as technical consultant, editor and member of a team that authored this item under contract with Herring Gas Company.)

Hunt, R.M. (1998). Yes They Can! Websites that Provide More than Information. *Competitive Edge!* July/August. Norcross, Georgia.

Hunt, R.M. (1997). Where in the World is the World Wide Web Headed in 1997? *Competitive Edge!* March/April. Norcross, Georgia.

Rouse, W.B., & Hunt, R.M. (1991). Transitioning advanced interface technology from aerospace to manufacturing applications. *International Journal of Industrial Ergonomics*.

Phillips 66 Company (1991). Safety and Warning Information Booklet for Propane Users. (Note: Served as project manager, editor and member of a team that authored this item under contract with Phillips 66 Company.)

Hunt, R.M. (1987). The difficulties of design problem formulation. In W.B. Rouse and K.R. Boff (Eds.), *System Design: Behavioral Perspectives On Designing Tools, and Organizations*. New York, New York: Elsevier Publishing.

Hunt, R.M., & Frey, P.R. (1987). Knowledge-aided display design (KADD) system: An evaluation. *Proceedings of the Human Factors Society 31st Annual Meeting*, New York, New York.

Hunt, R.M., & Maddox, M.E. (1986). A practical method for designing human-machine system interfaces. *Proceedings of the 1986 IEEE International Conference Systems, Man, and Cybernetics*, Atlanta, Georgia.

Hunt, R.M. (1985). Human factors of intelligent computer aided display design. *Proceedings of the First Annual Aerospace Applications of Artificial Intelligence Conference*, Dayton, Ohio.

Hunt, R.M., & Rouse, W.B. (1984). A fuzzy rule-based model of human problem solving. *IEEE Transactions on Systems, Man, and Cybernetics*, 14(1).

- Rouse, W.B., & Hunt, R.M. (1984). Human problem solving in fault diagnosis tasks. In W.B. Rouse (Ed.), *Advances in Man-Machine Systems Research*. Greenwich, CT: JAI Press.
- Frey, P.R., Sides, W.H., Hunt, R.M., & Rouse, W.B. (1983). *Computer-generated display system guidelines, Vol. I: Display Design*. Palo Alto, CA: Electric Power Research Institute.
- Hunt, R.M. (1982). A fuzzy rule-based model of human problem solving. *1982 Proceedings of the American Control Conference*. Washington, D.C.
- Hunt, R.M. (1982) Rule based models of human control of dynamic processes. *Proceedings of 1982 IEEE International Conference on Cybernetics and Society*. Seattle, WA.
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- Hunt, R.M., & Rouse, W.B. (1981). Problem solving skills of maintenance trainees in diagnosing faults in simulated power plants. *Human Factors*, 23(3).
- Rouse, W.B., & Hunt, R.M. (1981). A fuzzy rule-based model of human problem solving in fault diagnosis tasks. *1981 Proceedings of the Eighth Triennial World IFAC Conference*. Kyoto, Japan.

## TECHNICAL REPORTS

- Johnson, W.B., Norton, J.E., Duncan, P.C., & Hunt, R.M. (1988). *Development and demonstration of microcomputer intelligence for technical training (MITT) phase 1 final report* (AFHRL Tech. Rep.). Brooks AFB, TX: Air Force Human Resources Laboratory.
- Hunt, R.M. (1981). *Human pattern recognition and information seeking in simulated fault diagnosis tasks*. (Report No. T-110, Ph.D. Thesis). Coordinated Science Laboratory, University of Illinois, Urbana, Illinois.
- Rouse, W.B., Rouse, S.H., Johnson, W.B., & Hunt, R.M. (1980). *Human decision-making in computer-aided fault diagnosis* (Report No. 431). Arlington, Virginia: U.S. Army Research Institute for the Behavioral and Social Sciences.
- Hunt, R.M. (1979). *A study of transfer of problem solving skills from context-free to context-specific fault diagnosis tasks*. (Report No. T-82, M.S. Thesis). Coordinated Science Laboratory, University of Illinois, Urbana, Illinois.

## PRESENTATIONS

- Warnings: When Common Sense is all too Common, AEGIS Claims Seminar, San Diego California, October 2018.

You'll Shoot Your Eye Out, Presented at the DRI Fire Science and Litigation Seminar, Scottsdale, Arizona, November 2016.

Human Factors Engineering and Warnings in Skiing, Presented to the Association of Ski Area Defense Attorneys, Stowe, Vermont, February, 2015.

The Human Factor: The Psychology and Engineering Underlying Mountain Signage and Safety, Presented at the National Ski Area Association Conference and Tradeshow, Snowbird, Utah, 2013.

The New Normal In Higher Education, Presented at the Polytechnic Summit, Marietta, Georgia, June 2012. Zvi Szafran, David Caudill, Ruston Hunt, Tom Ball

Human Factors in Litigation, Institute of Continuing Legal Education in Georgia, 2001

Human Factors in Personal Injury Cases, National Association of Subrogation Professionals, 1998

## Ruston M. Hunt Prior Testimony

As of 7/1/2019

Plaint. or Def.	Date	Plaintiff v. Defendant	Court	Attorney
Plaint	Dep 11/2/12 Trial 3/11/16	Owens v C.W. Matthews et al 11EV012407C	District Court of Fulton County State of Georgia	Patrick Moore Weinberg, Wheeler, Hudgins, Gunn & Dial 3344 Peachtree Road Suite 2400 Atlanta, Ga
Def	Dep 7/19/13 Trial 7/17/2014	Fu v Reed CA# 2010V4488	State Court County of Houston State of Georgia	Douglas Smith Carlock, Copeland & Stair 2600 Marquis Two Tower 285 Peachtree Center Avenue Atlanta, Ga 30303
Plaint	Dep 1/15/2014	Hughes v Gilbane Construction 13 CV 004435	State of Ohio Court of Common Pleas Franklin County	Stephen S. Crandall Crandall Moses Pera & Wilt, LLC 5 539 East Washington Street Chagrin Falls, Ohio 44022
Plaint	Dep 3/5/2014	Brown v WRI 1:13-CV-00378	US District Court Northern District of Georgia Atlanta Division	Dwayne Adams Law Offices of Michael Lawson Neff 945 East Paces Ferry Road, Suite 1700 Atlanta, GA 30326
Plaint	Dep 5/6/2014 Trial 7/7/2015	Hernandez v Crown 7:13-CV-91-HL	US District Court Middle District of Georgia	Michael Warshauer Warshauer Law Group 3350 Riverwood Parkway Atlanta, GA 30339
Def	Dep 7/24/2014 Trial 12/10/2014	McLaughlin v CLP Mountain High, LLC. MC023780	Superior Court of California County of Los Angeles	Steven Parminter Wilson, Esler, Moskowitz, Edelman & Dicker LLP

				North District	555 South Flower Street Los Angeles, CA 90071
Plaint	Dep 8/15/2014	Chavez v Crown CV 2012 013480		Maricopa County Superior Court State of Arizona	J. Randolph Picket Picket Dummigan LLP 621 SW Morrison St., Suite 900 Portland, OR 97205
Plaint	Dep 9/5/2014	Griggs v Hi-Tech Labs CA 2013 A1353-7		State Court of Cobb County State of Georgia	Robin Frazer Clark Robin Frazer Clark, P.C. 1230 Peachtree Street, N.E., Suite 2323 Atlanta, GA 30309
Plaint	Dep 10/1/2014 (cont.) 10/6/2014	Delgado v Fuel Barons et al CN 502011CA 011245XXXXMB AJ		15th Judicial Circuit Palm Beach County, FL	Brian Denny Searcy, Denny, Scarola, Barnhart & Shipley, P.A. 2139 Palm Beach Lakes Blvd. West Palm Beach, FL 33409
Plaint	Dep 10/17/2014	Watsons v USA 3:13 - CV - 0757		US District Court Middle District of Tennessee Nashville Division	John L. Norris Norris & Norris, PLC 424 Church Street, Suite 1300 Nashville, TN 37201
Def	Dep 11/14/2014	Wilmes V Consumers Oil Company Cause No. 11ND-CV00659		CIRCUIT COURT COUNTY OF NODAWAY STATE OF MISSOURI	Mr. John V. McCoy MCCOY LEAVITT LASKEY LLC N19W24200 Riverwood Drive, Suite 125 Waukesha, WI 53188
Plaint	Dep 11/18/2014	Pardales v BMW et al 12-016586-NP		State of Michigan Circuit court for the County of Wayne	Ven Johnson Johnson Law, PLC

						Buhl Building 535 Griswold Street, Suite 2632 Detroit, MI 48226
Def	Dep 11/20/2014	Greeson v Black Hills Energy et al CN: C13-CV-24		District Court Seward County, Kansas		R. Scott Ryburn Anderson Byrd, LLP 216 S. Hickory P.O. Box 17 Ottawa, KS 66067
Plaint	Dep 1/15/2014	Leonard v Crown 1:14-CV-0024-WCO		US District Court Northern District of Georgia Atlanta Division		Michael Warshauer Warshauer Law Group 3350 Riverwood Parkway Atlanta, GA 30339
Def	Dep 2/9/2015	Kelly v Mesa Propane 2013 CV 14		District Court County of La Plata, Colorado		Tiffany A. Norton Senter Goldfarb & Rice, LLC 1700 Broadway, Suite 1700 Denver, CO 80290
Def	Dep 4/10/2015	West Fertilizer		District Court McLennan County Texas		Mr. John V. McCoy MCCOY LEAVITT LASKEY LLC N19W24200 Riverwood Drive, Suite 125 Waukesha, WI 53188
Plaint	Dep 4/15/2015	Terry v BEFCO 2013- CP-18-251		State of South Carolina County of Dorchester		Robert Goings Goings Law Firm, LLC 914 Richland Street, Suite A-101 Post Office Box 436 (29202) Columbia, South Carolina 29201
Plaint	Dep 6/8/2015	Busby v Beaufort City et al 2013-CP-07-01345		Court of Common Please County of Beaufort		McDougall Law Firm PO Box 1336   Beaufort SC, 29901

			State of South Carolina	115 Lady's Island Commons Beaufort, SC 29907 USA
Plaint	Dep 7/15/2015	Pittas v Buyers Products 12 L 759	Circuit Court of Cook County State of Illinois	Benjeman L. Nichols CAVANAGH LAW GROUP 161 N. Clark St., Suite 2070 Chicago, IL 60601
Plaint	Dep 7/21/2015	Roberts v Carroll County Water Authority NO. 14S00417	State Court of Carroll County State of Georgia	Brian D. Lewis Kam, Ebersbach & Lewis, P.C. P.O. Box 71609 Newnan, GA 30271-1609
Plaint	Dep 8/14/2015	Wallace v B&F Enterprises 14CV1170- TB	Superior Court of Paulding County State of Georgia	David S. Currie The Currie Firm 1455 Lincoln Parkway, Suite 300 Atlanta, GA 30346
Plaint	Dep 8/19/2015	Travis v Marta 2014 CV25350B	Superior Court of Fulton County State of Georgia	Christopher Graddock Morgan & Morgan, P.A. 191 Peachtree Street, NE Suite 4200 Atlanta, GA
Plaint	Dep 8/28/2015	Young v Raymond	Court of Common Pleas	Michael Warshauer
	Dep 1/20/2016	13CV009888	Franklin County	Warshauer Law Group
	Trial 10/19/2017		State of Ohio	3350 Riverwood Parkway Atlanta, GA 30339
Def	Dep 9/2/2015	Templo V Ballymore MID-L-2090-13	Superior Court of New Jersey Middlesex County	Lawrence Silverman Litchfield Cavo LLP 1515 Market Street Philadelphia, PA 19102
Plaint	Dep 10/15/2015	Coury v Textron, Inc.	US District Court	Eugene Covington

					District of South Carolina Greenville Division	Covington, Patrick, Hagins, Stern & Lewis, P.A. 211 Pettigru Street Greenville, SC 29602
Plaint	Dep 11/3/2015	Plato v Lubrizol 16-2012-CA-013602			Circuit Court Fourth Judicial Circuit Duval County, Florida	Tad Griffin Pajic & Pajic, PA One Independent Drive, Suite 1900 Jacksonville, Florida 32202
Plaint	Dep 12/30/2015	Ishmael v General Growth Properties CA #2014 RCCV 372			Superior Court of Richmond County State of Georgia	Nicholson Revell, LLP George S. (SAM) Nicholson Gateway Professional Center 4137 Columbia Road Augusta, Georgia 30907
Plaint	Trial 2/22/2016	White v Deere & Company CA # 13-cv-02173			United States District Court District of Colorado	Reed Morgan Law Firm of S. Reed Morgan, P.C. 413 8th Street Comfort, Texas 78013
Plaint	Dep 4/21/2016	Valentine v Blue Rhino Global Sourcing			United States District Court District of South Carolina Columbia Division	Charles Slaughter Walker Morgan, LLC 135 East Main Street Lexington, SC 29072
Def	Dep 5/6/2016	Feasel v Tracker Marine CN. 140500037			Second Judicial District Court Morgan County State of Utah	Michael McMullen Schlee, McMullen, McCarthy & Hansen P.C. 4050 Pennsylvania Ave, Suite 300 Kansas City, MO 64171-5430
Plaint	Dep 5/17/2016 Trial 2/21/2018	Roberts v Tractor Supply 1:14-CV-02332-RWS			United States District Court Northern District of Georgia	Steven Pickens Mahaffey Pickens Tucker, LLP

				Atlanta Division	1550 North Brown Road, Suite 125 Lawrenceville, GA 30043
Plaint.	Dep 5/20/2016	Stelly V Cambridge Downs 14EV002160D		State Court of Fulton County State of Georgia	T. Charles Alaska The Alaska Law Firm 8565 Dunwoody Place Atlanta, GA 30350
Plaint.	Dep 6/22/2016	Olvera v Mazda 13EV017592B		State Court of Fulton County State of Georgia	Lance Cooper The Cooper Firm 531 Roselane
Plaint.	Dep 6/27/2016	Peredia v HR Mobile et al CN 13CECG03137		Superior Court of the State of California County of Fresno	Marietta, GA 30060 Scott Righthand Law Office of Scott Righthand 275 Battery Street, Suite 1300 San Francisco, CA 94111
Plaint.	Dep 7/15/2016	Petersen v Raymond CN 2:14-cv-00894		US District Court District of Utah Central Division	Michael Warshauer Warshauer Law Group 3350 Riverwood Parkway Atlanta, GA 30339
Plaint.	Dep 7/27/2016	Delor v Georgia D.o.T. C.A.N 13CD5165ST		State Court of Ballwin County State of Georgia	Caroline Herrington Adams, Jordan, & Herrington, P.C. 577 Mulberry Street, Suite 1250 Macon, Georgia 31202
Plaint.	Dep 9/9/2016	Gaddy v TEREEX 1:14-cv-0928-WSD		United States District Court Northern District of Georgia Atlanta Division	Drew Ashby The Cooper Firm 531 Roselane Marietta, GA 30060
Def.	Dep 9/19/2016	Timmons v CPCChem Case No. 14-cv-03359-JNE-JJK		United States District Court District of Minnesota	Jason Zager Shook, Hardy & Bacon L.L.P. 2555 Grand Blvd.

							Kansas City, Missouri 64108
Plaint.	Dep 10/10/2016		Gilyard v Riley Forest Products, LLC et al C/A No: 2014-CP-03-00269		Court of Common Pleas County of Allendale State of South Carolina		Shane M. Burroughs LANIER & BURROUGHS, LLC 250 Gibson Street PO Drawer 2789 Orangeburg, SC 29116
Def.	Dep 10/27/2016		Campbell v Long's Propane Gas, LLC CN 15-002945-NI		Circuit Court County of St. Clair State of Michigan		Mr. John V. McCoy MCCOY LEAVITT LASKEY LLC N19W24200 Riverwood Drive, Suite 125 Waukesha, WI 53188
Plaint.	Dep 11/16/2016		Spencer v Park Place Grocery No. 1:12-cv-1967-WBH		United States District Court Northern District of Georgia Atlanta Division		Ann-Margaret Perkins Perkins Law Firm, LLC 515 Newnan Street Carrollton, GA 30117
Def	Dep 12/15/2016		Carr v National Standard Co. CV-2003-142.02		Circuit Court of Fayette County Alabama		Shook Hardy & Bacon 2555 Grand Blvd. Kansas City, MO 64108
Plaint	Dep 4/13/2017		Williams v Fontaine Commercial Trailer CV-14-900171		Circuit Court of Franklin County Alabama		Benjamin E. Baker Beasley Allen 218 Commerce Street Montgomery, AL 06702
Plaint	Dep 5/10/2017 Trial 11/27/2018		Blackwell v Tucker Door et al CA 16-C-01755-4		Circuit Court Gwinnett County Georgia		Steven Pickens Mahaffey Pickens Tucker, LLP 1550 North Brown Road, Suite 125 Lawrenceville, GA 30043

Plaint	Dep 6/9/2017	Williams v New Meadow Park Apartments CA 2016-CP-33-09	Court of Common Pleas	Dennis Smith
			State of South Carolina County of Marion	Dennis H. Smith, P.A. Surfside Beach, SC 29587
Plaint	Dep 7/7/2017 Trial 7/19/2017	Reinard v Crown Equipment Corp	United States District Court	Michael Warshauer
			Northern District of Iowa Eastern Division	Warshauer Law Group, P.C. 2740 Bert Adams Road Atlanta, GA 30339
Plaint	Dep 7/13/2017	Davis v Ford Motor Co. 16C-04985-4	Superior court of Gwinnett County State of Georgia	Conley Griggs Partin LLP 1380 W. Paces Ferry Rd NW Atlanta, GA 30327
Def	Dep 7/18/2017	Sheehan v Energy Transfer Partners DV-14-664A	Montana Eighteenth Judicial District Court, Gallatin County	Eugene LaFlamme McCoy Leavitt Laskey, LLC N19W24200 Riverwood Drive, Suite 125 Waukesha, WI 53188
Plaint	Dep 7/26/2017	Devit v Georgia Eye Institute STCV1700001	State Court of Chatham County State of Georgia	Bobby Phillips Carson & Phillips 420 West Broughton Street Savannah, GA 31401
Def	Dep 8/19/2017	Johnson v Amerigas Propane CA 1:13-cv-00806-cc	US District Court Northern District of Georgia Atlanta Division	Brooke Laskey McCoy, Leavitt, Laskey, LLC 1803 Rio Grande Boulevard Albuquerque, New Mexico 87104
Plaint	Dep 9/6/2017 Dep 9/18/2017	Plumlee v Alliance 2015-CP-10-4927	State of Carolina Court of Common Pleas	Samuel K. Allen CLORE LAW GROUP



Def	Dep 5/2/2018	Williams v Amerigas 17 CVS 6981	Superior Court Division State of North Carolina County of Wake	John Hansen McCoy Leavitt Laskey LLC 8700 Monrovia, Suite 310 Lenexa, KS 66215
Plaint	Dep 5/24/2018	Lopez v Dewalt PAS-L-1964-16	Superior court of New Jersey Passaic County	Alan Friedman Bagolie Friedman, LLC 648 Newark Avenue Jersey City, New Jersey 07306
Def	Dep 7/11/2018	Ventura v Southern States Cooperative 17-CVS-565	State of North Carolina General Court of Justice Superior court Division	David Dahlmeier Bassford Remele 100 South 5th Street, Suite 1500 Minneapolis, MN 55402-1254
Plaint	Dep 7/31/2018	Kovalski, III. V Premier Kings Of Georgia 17A63490	State Court of DeKalb County State of Georgia	Raymond T. Brooks, Jr. 281 Scenic Highway Lawrenceville, Georgia 30046
Plaint	Dep 8/29/2018	McBride v Royal management STC1700789	State Court of Chatham County State of Georgia	Bryan Baer 1447 Peachtree St NE Suite 550, Atlanta, GA 30309
Def	Dep 9/14/2018	Lopez v Big Tex 1:17-cv-1235 MV/JHR	US District Court District of New Mexico	Kevin Banville McCoy, Leavitt, Laskey, LLC 317 Commercial St. NE, Suite 200 Albuquerque, New Mexico 87102
Plaint	Dep 10/23/2018	Herrera v Southern Cal Edison BC 558894	Superior Court of the State of California County of Los Angeles	Stephen C. Ball Ball & Bonholtzer 300 North Lake Avenue, Suite 1100 Pasadena, California 91101

Plaint	Dep 12/5/2018	Austin v Merritt CV-2016-900081		Circuit Court Covington County, Alabama	Benjamin E. Baker Beasley Allen 218 Commerce Street Montgomery, AL 06702
Plaint	Dep 12/13/2018 Dep 4/18/2019	Hampton v Raymond File No. 1:18-CV-00081-RWS		US District Court Northern District of Georgia Atlanta Division	Michael Warshauer Warshauer Law Group, P.C. 2740 Bert Adams Road Atlanta, GA 30339
Plaint	Dep 2/25/2019	Turner v Moncks Corner, LLC Case No. 2017-CP-08-10978		Court of Common Pleas 9th Judicial Circuit County of Berkeley, South Carolina	Emily Hanewicz Tong Wigger Law Firm, Inc. 8086 Rivers Avenue, Suite A North Charleston, SC 29406
Plaint	Dep 6/3/2019	Scannavino v FCA Corporation Case No. 17C06784-1		In the State Court of Gwinnett County State of Georgia	Christopher Glover Beasley Allen 4200 Northside Parkway NW Building One, Suite 100 Atlanta, GA 30327

**APPENDIX C**  
**Letter of Engagement**

***RM Hunt, Ltd.***

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5833 Revington Drive, Peachtree Corners, GA 30092 USA

Russ@RMHunt.com

Tel: 770.356.8846

Bruce Moss  
Denenberg Tuffley  
One Northwestern Plaza  
Suite 600  
Southfield, MI 48034

**RE: Kwiatkowski v FXI**

Dear Mr. Moss:

This letter will serve to memorialize my fees, the services I am prepared to provide and the terms and conditions of my engagement should you wish to retain me. Enclosed please find a copy of my CV.

I require a \$2,000, non-refundable, retainer to be paid in advance of any work. This retainer must be paid before I am designated as an expert in this matter. My fee for research, analysis, consultation and testimony is \$350 per hour. Travel and other costs which may be incurred as a result of research and preparation for this case will be passed through at cost. Initial fees and costs will be billed against the retainer. Once the retainer is exhausted I will submit invoices on a monthly basis with payment terms of net 30. It is to be understood that I am engaged in the subject case by your law firm and not your firm's client. Payment for my services will in no way be contingent on my opinions or the outcome of the subject case.

My services may include some or all of the following; examination of the objects(s) involved in the litigation, visit(s) to the site of the incident, telephone consultations, literature research, review of the products of discovery, meetings with you and/or your client, a written report of my findings (if and only if requested), and testimony at deposition and trial. My research and the formulation of my opinions shall be directed by my training and experience.

Please do not hesitate to contact me should you have any questions or need additional information.

Sincerely,



Ruston M. Hunt, PhD

## **APPENDIX D**

### **Human Factors and Ergonomics**

#### **Analysis Process**

The study of human factors or ergonomics focuses on human beings and how they interact with products, devices, procedures, work spaces, and environments encountered at work and in daily living. Human factors engineering applies knowledge about human strengths and limitations to the design and evaluation of interactive systems of people, equipment, policies and their environment to ensure meeting the goals of effectiveness, safety, and user acceptance. Successful systems must meet all three goals.

#### **Core Competencies of Ergonomists**

The Board of Certified Professional Ergonomists initiated certification of ergonomists in 1992 according to the body of knowledge or core competencies listed here below.

##### **A. Basic Principles of Ergonomics**

1. Systems Concepts
2. Design Concepts

##### **B. Core Background Relevant to Ergonomics**

1. Human Attributes
  - 1.1 Anthropometry & Demography
  - 1.2 Physiology & Biomechanics
  - 1.3 Psychology
2. Environmental Context
  - 2.1 Physical Environment
  - 2.2 Social Environment
  - 2.3 Organizational Environment

##### **C. Core Methodology: Analysis and Design of Processes and Products**

1. Statistics and Design of Investigations
2. Basic Process Analysis
3. Design Methods
4. Basic Usability

##### **D. Methods and Content Specific to Application Area**

1. Human-Machine Interaction
  - 1.1 Methods—systematic procedures, principles, and techniques
  - 1.2 Content—design and evaluation information applied to human-machine interactions.
2. Human-Environment Interaction
  - 2.1 Methods—systematic procedures, principles, and techniques
  - 2.2 Content—design and evaluation information applied to task appropriate situations.

3. Human-Software Interaction
  - 3.1 Methods—systematic procedures, principles, and techniques
  - 3.2 Content—design and evaluation information applied to user interfaces.
4. Human-Job Interaction
  - 4.1 Methods—systematic procedures, principles, and techniques
  - 4.2 Content—design and evaluation information applied to job and work situations.
5. Human-Organization Interface
  - 5.1 Methods—systematic procedures, principles, and techniques
  - 5.2 Content—design and evaluation information applied to socio-technical systems.

I am knowledgeable and experienced in the core competencies listed here via my graduate school education as well as more than thirty years of practice in human factors research and design and more than fifteen years of teaching human factors classes in undergraduate and graduate programs.

### **Role of Human Factors Engineering in Design**

It is important to understand the role and purpose of human factors engineering in the context of equipment design. The following definitions are typical of those found in the literature.

Human factors engineering is the application of psychological and physiological principles to the engineering and design of products, processes, and systems. The goal of human factors is to reduce human error, increase productivity, and enhance safety and comfort with a specific focus on the interaction between the human and the thing of interest. (An Introduction to Human Factors Engineering, Wickens et al, 1997)

Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design to optimize human well-being and overall system performance. (International Ergonomics Association, 2014)

It is important to note that both of these definitions recognize that human factors serves a product design function. “Human factors and ergonomics professionals play a significant role in the design of consumer products, medical devices, construction and agricultural equipment, complex aircraft and spacecraft, pedestrian and vehicle transportation systems, manufacturing facilities

and processes, office environments, hospital and healthcare delivery systems, and a multitude of other applications.” (Position Paper Supporting Human Factors and Ergonomics Practitioners in Forensics, 2014) In all cases, human factors knowledge and expertise is recognized as critical to the design of safe, effective and user acceptable product performance.

### **Role of Warnings and Instructions in Design**

Manufacturers of equipment, whether consumer products or industrial products, must insure that users of their products are adequately informed of all hazards associated with the anticipated use of the product and how to mitigate these hazards. The Consumer Product Safety Commission states that the ability of manufacturers to recognize and anticipate the circumstances under which products are used or misused is central to the effective design and production of safe products (CPSC, 2006). In another publication the CPSC states, “Instructions do not exist in a vacuum. They are part of a system of product-oriented elements that must work together. These elements include the physical product design, user interfaces, on-product warnings and messages, packaging, marketing and training.” It goes on to point out, “Instructions are a tool for consumers to use to do something. Like any other good tool, instructions must be designed for use. Think of their development not as an effort of writing, but of engineering.” (CPSC, 2003) It is with this approach in mind that this report analyzes the design of the subject warnings and instructions.

The efficacy of warnings and instructions depends on a number of factors including but not limited to:

1. Operator comprehension of the intended warning and/or instruction,
2. The ability of the operator to carry out the action indicated by the instruction/warning in the context of mental and/or physical stresses they are likely to be facing.

The literature in accident investigation is replete with examples of highly trained individuals such as aircraft test pilots and surgeons, who, if they had correctly followed their training, instructions and/or warnings, would have avoided disastrous outcomes. Historically, such accidents were often labeled as being caused by human error. But, doing so does not avoid future similar outcomes.

Through Human Factors analysis it has been recognized that simply mandating that operators follow warnings and instructions is not a reliable approach to reducing accidents and injurious outcomes. Even when the operator has been fully trained and understands the particular warnings and instructions, they may not perform in accordance with them. Human factors analysis often identifies elements of the design or operational environment that interfere with the operator's ability to follow warnings and instructions.

In a wide variety of contexts, human factors analysis has identified the need for specific design changes. The knowledge, training and experience of human factors engineers is routinely used to specify operational design requirements that identify the essential capabilities and associated detailed design requirements of an operator-to-machine interface. In this way, human factors engineers routinely drive the design of products and as result, are part of the product design team.

One of the responsibilities of human factors engineers is to identify situations where training, instructions and warnings are not sufficient to protect operators from injury. A human-machine interface design that is overly reliant on constant vigilance, adherence to the rules and error-free behavior of a human operator to prevent injury, is a potentially defective design. It is not reasonable to expect that the typical mechanical or electrical engineer will have the training and experience to recognize these situations because they lack an appreciation for user-centered design. Thus, a human factors engineer should be part of any design effort where the potential for injury is anticipated or recognized in practice.

Based on their education, training and experience, human factors engineers are capable of identifying human-machine interface design defects. Similarly, they contribute to the design of human-machine interfaces by application of knowledge of human strengths and weaknesses, both physical and cognitive.

### **Analysis Process**

The process described here follows the scientific method and human factors methods developed and tested over fifty years of engineering and psychology research and practice that has defined

the field (Duncan et al, 2004). Information may be gathered through demonstration, inspection, analysis and/or empirical testing in order to test designs against accepted standards, guidelines, and regulations (CPSC, 2006). The process outlined here below is a collection of accepted methods and standards specific to human factors analysis. These methods apply to original design and evaluation as well as post hoc accident analysis and assessment.

I am frequently called upon to offer opinions in the areas of warnings. However, it is important to recognize where warnings fit into the overall process of human factors design and evaluation. As discussed in step two of this process, many hazards can and should be controlled by elimination and/or guarding; these approaches are generally more reliable than warnings. But, the process described here assumes that warnings are at least an element of the approach to hazard control. Therefore, after step two the process listed here focuses on warnings issues.

1. **Identify hazards.** Hazards may be identified in a number of ways. For example, hazards may be identified by looking at accident reports or statistical summaries such as the NIOSH Fatality Assessment and Control Evaluation Program (FACE) ([www.cdc.gov/niosh/face/](http://www.cdc.gov/niosh/face/)), CPSC's National Electronic Injury Surveillance System (NEISS), a national probability sample of hospitals in the U.S. and its territories ([www.cpsc.gov/library/neiss.html](http://www.cpsc.gov/library/neiss.html)) or the Integrated Management Information System (IMIS) (<https://www.osha.gov/pls/imis/accidentsearch.html>) maintained by OSHA. However, as pointed out by Stuart Statler, former Commissioner of the Consumer Product Safety Commission, "we should not need to await a body count of injuries and deaths from any particular consumer product before corrective action is warranted." (Statler, 2005)

Even in the absence of empirical evidence of injuries, product analysis can identify the opportunity for potential uncontrolled release of electrical, mechanical and other types of energy and to determine severity and likelihood of injury (NIOSH Safety Alert, 1999). For example, information from the Hazardous Material Information System (HMIS) developed by the National Paint and Coatings Association and the NFPA 704 Standard, or the NFPA Diamond as it is commonly known, provides hazard rating indices for

common industrial and household chemicals. Empirical injury data are not needed to conclude that certain chemicals are hazardous. Similarly, pinch points, trip hazards, exposure to electrical current and other hazards may be identified by inspection.

2. **Consider whether hazards can be eliminated or mitigated by following the hazard control hierarchy.** The Hazard Control Hierarchy has been the standard overarching approach to controlling hazards in the workplace since the mid 1950's when it was first put forth in an Accident Prevention Manual published by the National Safety Council. It is often referred to as the trilogy: Design, Guard, and Warn. Variations on the original Hierarchy have been developed (e.g., ANSI/AIHA Z10-2005) but the essence of the approach has remained unchanged since the original conception. Literally hundreds of scientific and engineering papers have been written in the last fifty years in which the Hazard Control Hierarchy is taken as a given. (Vrendenburgh, 2005; Cheatham, 2003; Barnett, 1988) The Hazard Control Hierarchy continues to be included in standards such as ANSI/ASSE Z590.3 – Prevention through Design that was approved in 2011. To summarize, this approach is not new and it is still in use today.

The Hazard Control Hierarchy specifies that when hazards are identified, the most reliable way to control hazards is to **eliminate** them from the design. ISO refers to this step as using “inherently safe design measures.” Of course, analysis of the product or process may determine that the hazard is inherent in the function of the product and therefore cannot be eliminated without compromising the effectiveness of the product.

The second most reliable means to control hazards is to **mitigate** the likelihood of injury or the severity of injury associated with a hazards. One might create a physical guard to protect people from injury. Machinery and machine guarding is specified for many applications by entities such as OSHA, ANSI, CPSC, ISO, Underwriters Laboratories, ASME and many others. However, guarding is not limited to physical guards typically addressed by these groups but may also involve safety interlocks, personal protective equipment, administrative controls, etc. Guarding is a function to be performed, not necessarily a physical device and it may be accomplished by mitigating the likelihood of

encountering a hazard and/or by mitigating the damages/injury that might result from such an encounter.

The third most reliable approach to controlling hazards is to **communicate** about the hazard to people so that they may protect themselves from the hazard. Communication may come in many forms and formats and from many different sources. Warnings may instruct users of unknown hazards or they may remind users of the presence of a known hazard. Instructions may provide safe procedures for avoiding injury. Hereafter, the term “warning” shall include all variety of form and format of communication that might be used to convey safety related information to users.

3. **Consider the need for, and viability of, warnings, instructions and/or other collateral materials.** The goal of user-centered task analysis is to create a model of the task and users sufficient to determine both the need for warnings and the best opportunities to provide warnings. (Lehto and Miller, 1988; Wogalter, DeJoy and Laughery, 1999)

Significant research literature can be referenced to understand how people do interact or should be expected to interact with systems ranging from simple consumer products to complex, highly sophisticated systems. Models of human system interaction may be simple or extremely complex depending on the complexity of the task and the sophistication of the system and users. It is possible that such analysis may conclude that warnings are not likely to reliably control a hazard given what is known about the task, the system, and/or users.

4. **Consider existing labels, warnings, instructions and other collateral materials to determine if hazards are adequately identified and if so, how warning information is conveyed to affected parties.** This step involves looking at on-product labels as well as collateral materials such as package labeling, marketing materials, instructions, user manuals, maintenance manuals, videos, web sites, etc. Once identified and documented

these materials are compared to relevant applicable regulations and standards identified in steps 7 and 8 of this process.

5. **Consider similar products and processes to establish the state of the art for product and process design.** The purpose of this step is to identify the existence and viability of alternative design, guarding, and/or warnings and instructions. Where alternative designs are available it may be possible to collect data on comparative effectiveness, safety and user-acceptance.
6. **Consider pertinent training materials.** Some manufacturers require or assume a level of training for users of their products. In such cases it is necessary to assess the adequacy of the training materials and also the efficacy of this approach. Such training is specifically addressed in documents such as, for example, HCS 1910.1200(h). Of course, certain products and environments, such as those available to the general public, must assume little to no training or prior experience.
7. **Consider the behavior of the individual(s) involved.** The purpose of this step is to use deposition testimony, accident reports and physical evidence to document specific types of behavior of the individual(s) involved. Results of this analysis are used to assess understanding, compliance and adequacy of existing warnings to affect behavior modification. These include;
  - a. Was the behavior of the individual(s) involved in conflict with any explicit warnings or instructions given to them?
  - b. Was there evidence in the behavior of the individual(s) involved consistent with an effort to comply with warnings and/or follow instructions?
  - c. If there was evidence of any unsafe behavior was it more likely intentional assumption of risk or due to a lack of awareness or understanding of the hazard?
  - d. Was the behavior of the individual(s) involved reckless or otherwise inappropriate for the situation in which the product was used?
  - e. Was the behavior of the individual(s) involved foreseeable?

- f. Was the behavior of the individual(s) involved reasonable given his or her understanding of the product?

8. **Consider relevant applicable regulations.** In some but not all cases, there are regulations that define specific statutory requirements for design, guarding, instructions, warnings, product labeling, etc. that apply to a specific product or class of products. Examples include regulations associated with the Consumer Product Safety Act (CPSA), the Federal Hazardous Substances Act (FHSA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Occupational Safety and Health Act (OSHA) and the Fair Packaging and Labeling Act (FPLA). Analyses of regulations such as these and the subject warnings, instructions, product labeling, etc. may reveal deficiencies.
9. **Consider standards within the industry and generic industrial standards (a.k.a. voluntary or consensus standards).** Voluntary or consensus standards are promulgated by organizations such as the American National Standards Institute (ANSI), the National Fire Protection Association (NFPA), ASTM International, originally known as the American Society for Testing and Materials (ASTM), the National Paint and Coatings Association (NPCA) and many, many more. These organizations have rigorous development and review processes that require significant consensus to be reached by the parties impacted by the standard before the standards can be released. From a scientific standpoint, these standards typically provide more thorough and reliable design and evaluation guidance than do regulations.

The Consumer Product Safety Act specifically recognizes and relies upon such standards - 15 USC §2056(b)(1) states “The Commission shall rely upon voluntary consumer product safety standards rather than promulgate a consumer product safety standard prescribing requirements described in subsection (a) of this section whenever compliance with such voluntary standards would eliminate or adequately reduce the risk of injury addressed and it is likely that there will be substantial compliance with such voluntary standards.”

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